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Outcome of ProCol, a Bovine Mesenteric Vein Graft, in Infrainguinal Reconstruction

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Objectives: historically infrainguinal reconstruction using heterogenous grafts has given poor results due to degradation and aneurysmal dilatation of the graft. A recently introduced heterogenous graft, the ProCol (bovine mesenteric vein) graft, may yield improved results. There are no published reports with respect to ProCol in infrainguinal reconstruction and hence we have reviewed our initial experience with this graft.

Methods: retrospective analysis of six patients in whom infrainguinal reconstruction with ProCol was undertaken between March and August 2001.

Results: the primary patency rate was 0% at 3 months, with grafts failing between 4 and 113 days. Two grafts underwent aneurysmal dilatation.

Conclusion: we are unable to recommend use of the ProCol graft in infrainguinal reconstruction.

Key Words: Heterogenous grafts; Infrainguinal reconstruction; ProCol grafts; Bovine grafts.

Introduction

The use of alternative biological materials, in preference to prosthetic, is conceptually advantageous in infrainguinal reconstruction when autologous vein is not available. Heterogenous grafts have however proved disappointing in this respect. It has been suggested that a recently introduced graft, the ProCol glutaraldehyde tanned bovine mesenteric vein graft (Hancock Jaffe Laboratories, CA, U.S.A.), may yield better results [Oztekin OTO, Sariosmanoglu N, Ccikel U, Hazan E, Catalyurek H, Sillstrell E, Early experience with ProCol (bovine mesenteric vein) Vascular Bio-prosthesis in infrainguinal arterial reconstructions].

To date there are no published results looking at the use of ProCol grafts in infrainguinal reconstruction. In the absence of such data we have reviewed our initial experiences with this graft.

reconstruction with ProCol between March and August 2001. ProCol was used where autologous vein would have been the conduit of choice but was unavailable. The graft was used in accordance with the manufacturer's guidelines.

Five patients had Fontaine stage III limb ischaemia and one Fontaine stage IV. Four of the six had undergone previous infrainguinal reconstructive surgery.

Two grafts were anastomosed to the supragenicular popliteal artery, one was an interposition graft, one to the infragenicular popliteal artery and two onto crural vessels. Pre-operative investigations had demonstrated satisfactory distal run off in all six patients, and intra-operative quality control with Doppler ultrasound was satisfactory in all cases. Postoperatively all patients were entered into a graft surveillance program.

Retrospective analysis of the six reconstructions was performed with patient interview, examination and review of the notes.

Materials and Methods

Six patients (three male, age range 53–78 years) at our institution underwent infrainguinal arterial

Results

All six ProCol grafts implanted have failed. This occurred from 4 to 113 days post operatively and was confirmed by arterial duplex scanning. The mechanism of failure was thrombosis in five patients,

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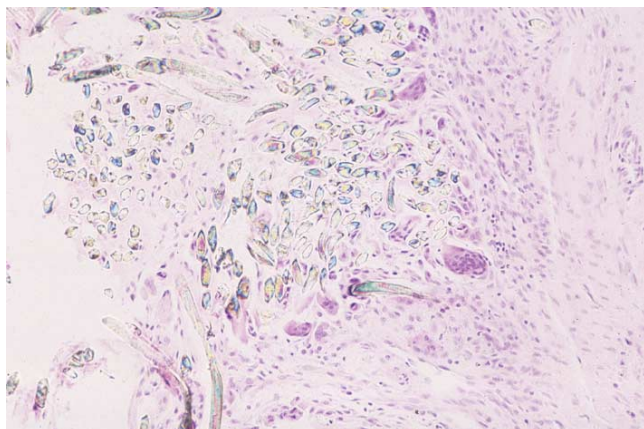


Fig. 1.

whilst one failed secondary to aneurysmal dilatation. In one case of graft failure secondary to thrombosis there was immediate aneurysmal dilatation of the graft on perfusion. This was related to a venous tributary and was corrected at the time. In all two out of the six grafts underwent dilatational changes after implantation.

The graft that failed secondary to aneurysmal dilatation was biopsied and a cross section of this is shown in Figure 1. This shows marked giant cell infiltration but no evidence of acute infection in the graft material.

Discussion

Our initial experience with ProCol in infrainguinal reconstruction yielded a primary patency rate of 0%, and whilst not the subject of a formal randomised controlled trial, this is at considerable variance with our audited and expected outcome for this type of reconstruction.

Autologous long saphenous vein is unavailable or unsuitable for use in approximately 30% of patients.¹ Historically, the search for a vein substitute has followed two main paths. One of these involved the use of umbilical vein allograft, and was particularly popular in the late 1980s.² Although initial patency rates were promising,³ umbilical vein was found to be subject to a high incidence of graft degradation and aneurysm formation.^{4,5}

The second alternative was the use of heterogenous graft. An example of this was the modified bovine carotid artery graft, first used in 1963. This was again

abandoned as a result of the high aneurysmal dilatation rate.⁶ Unfortunately, further attempts using heterogenous grafts have likewise yielded poor long term results due to degeneration and aneurysmal changes, and have since fallen out of favour.^{7,8} One heterogenous graft, the BioPolyMeric graft (St Jude Medical Inc., MN, U.S.A.), appeared initially to yield good long term patency rates.⁹ However, all reconstructions reported were supragenicular, for which most would use PTFE as the preferred conduit in the absence of vein. The incidence of graft dilatation may also have been under reported in this study as angiography was used for graft surveillance, which is less sensitive than duplex scanning for detecting aneurysmal disease.¹⁰

Our initial experience with ProCol in infrainguinal reconstruction has been very disappointing, and we have ceased implanting this graft. We are unable to recommend ProCol graft for arterial reconstruction in the lower limb.

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